1 *Introduction*

Repetition is encountered in every language and affects all types of linguistic units. One finds reiteration of phrases, as in the Quechua example in (1a), of words, as in the Amele example in (1b), and even of single segments, as in the onomatopœtic ideophone from English (1c):

(1) a. Chawra mishi alpurhapita **[horqorkur kutirkUchir] [horqorkur kutirkUchir]** huk umallantashi chunka ishkayta yupaykun.

'Then the cat, **repeatedly removing** the head from the saddlebag and **returning** it, counts the one head twelve times.' (Weber 1989:323)[1]

b. Odeceb **fojen**. Rum oso eu **fojen**. Ihoc leceb haun rum oso na li **fojen**. Ihoc leceb haun rum oso na li **fojen**. Ihoc leceb oso na ha li ihoc leceb haun jo oso na toni nu lena. **Fojen**. Ihoc leceb jo oso na toni nu len eu na **fojen** ihoc len. Rum cunug ca **foji** hedon. Odimei madon, "Quila qa ihoc," don.

'Then she **vomited**. She **vomited** in that room. Then after she had filled that room with **vomit** she went to another room and filled that with **vomit** and then filled another room with **vomit**. Then she went down and went to another house. She **vomited** there. She filled all those rooms with **vomit**. Then she finished **vomiting** and said to him, "Now that is enough."' (Roberts 1987:255–56)

c. English: [ʃ-ʃ-ʃ-ʃ-ʃ . . .] 'be quiet!'

This book concerns itself with a select subtype of repetition, namely grammatical doubling or duplication effects within words, illustrated by the forms in (2). Word-internal reduplication may be partial (a) or total (b, c); it may involve perfect identity between copies (c) or exhibit imperfect identity (a, b).[2]

(2)

a.	Hausa	kiraː	'call'	kik-kiraː	(pluractional)
b.	Amele	bala-doʔ	'to tear'	bala-bulu-doʔ	(irregular iterative)
c.	Warlpiri	kamina	'girl'	kamina-kamina	(plural)

The mechanism of reduplication and manner in which copies can differ from each other have been a foundational concern in theoretical and descriptive

linguistics over the past twenty-five years. They constitute the central interest of this book.

1.1 Two approaches to duplication

Speaking broadly, two general approaches to duplication are possible: *phonological copying* and *morpho-semantic (MS) feature duplication*. Phonological copying is an essentially phonological process that duplicates features, segments, or metrical constituents, as in the example of 'eat' in (3a). Under MS feature duplication, two identical sets of abstract syntactic/semantic features ('EAT', in (3b)) are provided by the grammar and spelled out independently (3b).

(3) a. [EAT] → [eat] → [eat-eat]
Spellout **Phonological copying**

b. [EAT] → [EAT] [EAT] → [eat-eat]
MS feature duplication ***Spellout***

While theories of morphological reduplication have focused on the duplication mechanism of phonological copying, it is the thesis of the present work that both mechanisms are needed and that their empirical domains of application are nearly complementary. In introducing this vision it is useful first to consider cases which clearly instantiate the two poles of duplication.

The clearest examples of phonological copying are those in which small pieces of phonological structure are copied to satisfy a phonological well-formedness constraint. In Hausa (Chadic), for example, the most productive noun pluralization suffix is *-oːCiː*, whose medial consonant is a copy of the final consonant of the noun stem (Newman 2000:431–32). As noted by Newman, who calls this phenomenon "pseudoreduplication" (p. 511), copying is driven by the need to flesh out an underspecified suffixal consonant (or, on another view, to provide an onset to the final syllable of the suffix). The data shown here are taken from Newman 2000:432:

(4) a. bindigàː bindig-oːgiː 'gun/guns'
b. fannìː fann-oːniː 'category/categories'
c. hùkuːmàː hukuːm-oːmiː 'governmental body/bodies'

The well-known Yoruba gerundive construction constitutes another instance of phonologically driven copying (Akinlabi 1985, Pulleyblank 1988, Kawu 1998).[3] Gerunds are formed by prefixation of a high front vowel marked with a high tone (*í-*), preceded by a copy consonant whose presence Akinlabi and Kawu

attribute to the need for Yoruba syllables to begin with a consonantal onset. Although Alderete et al. (1999) treat Yoruba gerunds as resulting from morphological reduplication, Akinlabi and Kawu instead view them as an instance of what Newman (2000) calls "pseudoreduplication" or what Urbanczyk (1998) calls "non-reduplicative copying." The data below are taken from Kawu 1998:3:

(5)

Verb	Gerund	
gbé	**gb-**í-gbé	'take; taking'
jɛ	**j-**í-jɛ	'eat; eating'
wɔ	**w-**í-wɔ	'enter; entering'
wã	**w-**í-wã	'measure; measuring'
bú	**b-**í-bú	'insult; insulting'

In contrast to phonologically driven local duplication of phonological material are clear cases of MS feature duplication. Such cases typically have morphological or syntactic, rather than phonological, motivation; they duplicate more than a single phonological element; and they may not even result in phonological identity. Consider, for example, Modern Hebrew VP-fronting, a construction in which the verb is spelled out in two positions (Landau 2003:7):[4]

(6) lirkod, Gil lo yirkod ba-xayim
to-dance, Gil not will-dance in-the-life
'Dance, Gil never will'

The source of MS feature duplication will vary across theoretical frameworks; on Landau's analysis, verb doubling results from the pronunciation of two links of a chain (i.e. copies of identical feature bundles in the terms of Chomsky 1995; 2000). What is relevant is that the duplication in (6) cannot be analyzed as phonological copying. It is not motivated by phonological well-formedness and the two copies are not even phonologically (or morphologically) identical. While there is full inflection on the lower copy of the verb, the higher verb is an infinitive. Divergent spellout of this sort is a clear sign that what is being copied is an abstract syntactic or semantic aspect of the representation, rather than phonological material.

Despite the existence of these two very different mechanisms for duplicating grammatical material, virtually no attention has been given in the reduplication literature to arguing for one over the other. Instead, theoretical approaches to morphological reduplication have focused nearly exclusively on the idea that phonological copying occurs to flesh out a skeletal reduplicative morpheme (see,

for example, Marantz & Wiltshire 2000 for a recent overview).[5] The example in (7), using the Warlpiri form for 'girls' (Nash 1986:130), illustrates total reduplication under the dominant derivational approach taken in the 1980s (Marantz 1982; Clements 1985; Kiparsky 1986; Mester 1986; Steriade 1988). RED, a skeletal Prosodic Word affix marking the plural, is fleshed out by copying the base segments and associating the copies by rule to the RED template.

(7) Morphological reduplication by phonological copying

Affixation			Copy and Association	
$\text{RED}_{\text{plural}}$ +	PWd	→	RED	PWd
	△		△	△
	kamina		kamina	kamina
	'girl'			'girls'

The more recent Base-Reduplication Correspondence Theory (BRCT) approach to reduplication in the Optimality Theory literature makes the same assumptions, with the additional proposal that copying into the RED morpheme is coerced by violable constraints that compel RED to be identical to the base (McCarthy & Prince 1993; 1995a; for an overview, see Kager 1999). In the Chumash example in (8) (Applegate 1976), RED is required, by the output constraint $\text{RED} = \sigma_{\mu\mu}$, to instantiate a bimoraic syllable and, by BR-FAITH, to correspond segmentally to the material in the base. IO-FAITH » $\text{RED} = \sigma_{\mu\mu}$ prevents the base from truncating:

(8) Morphological reduplication by BR correspondence

	RED, č^{h}umaš	**IO-FAITH**	**RED=$\sigma_{\mu\mu}$**	**BR-FAITH**
☞ a.	č^{h}um-č^{h}umaš			aš
b.	č^{h}umaš-č^{h}umaš		aš!	
c.	č^{h}um-č^{h}um	aš!		

A definitive rationale for providing a phonological copying analysis, rather than a MS feature duplication analysis, of phenomena of this type has not been provided in the literature.[6] One likely motivation for the focus on phonological copying is the variety of phonological modifications that often accompany morphological reduplication.[7] However, as is argued at length in Chapters 3 and 4 of this book, phonological modification is not restricted to morphological reduplication and cannot be used as a criterion to determine the doubling mechanism. Truncation is found not only in morphological constructions which are

not reduplicative (see, for example, Weeda 1992; McCarthy & Prince 1999b and Chapter 3), but is found even in clearly "syntactic" reduplication constructions where MS feature duplication is unequivocally at work.

Consider, for example, the phenomenon in Fongbe (Kwa) which Lefebvre and Brousseau (2002) analyze as syntactic doubling of the verb. Verb doubling occurs in four syntactic constructions: temporal adverbials (9a), causal adverbials (9b), factives (9c), and predicate clefts (9d). In each case, an extra copy of the verb appears initially in the verb phrase. The fronted copy of the verb can be identical to the main verb; crucially, for some speakers, it can also be truncated to its first syllable (Collins 1994, cited in Lefebvre & Brousseau 2002:505):

(9) a. **sísɔ́ ∼ sí** Kɔ́kú **sísɔ́** tlóló bɔ̀ xɛ̀sí dì Bàyí
tremble Koku **tremble** as.soon.as and fear get Bayi
'As soon as Koku trembled, Bayi got frightened'

b. **sísɔ́ ∼ sí** Kɔ́kú **sísɔ́** útú xɛ̀sí dì Bàyí
tremble Koku **tremble** cause fear get Bayi
'Because Koku trembled, Bayi got frightened'

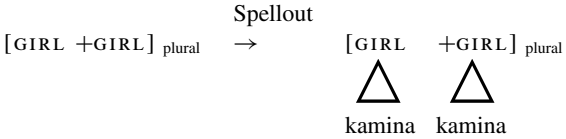
c. **sísɔ́ ∼ sí** dé-è Bàyí **sísɔ́** ɔ́, vɛ́ nú mi
tremble OP-RES Bayi **tremble**, DEF bother for me
'The fact that Bayi trembled bothered me'

d. **sísɔ́ ∼ sí** wɛ̀, Kɔ́kú **sísɔ́**
tremble it.is Koku **tremble**
'It is tremble that Koku did'

In Fongbe, the only difference between the main verb and its fronted copy is the optional truncation; both copies can be assumed to have phonologically and semantically identical inputs.

A second likely motivation for the lack of attention to the issue of whether phonological copying or MS feature duplication underlies reduplication is simply that so many cases of canonical morphological reduplication appear amenable to either approach. By way of illustration, consider again the case of total pluralizing reduplication in Warlpiri, for which a standard phonological copying analysis was presented in (7). Suppose, instead, that plural formation in Warlpiri is governed by a morphological construction, such as the one shown in (10), which dictates double insertion of the singular form of the noun. In this case, there would be no phonological copying. Such an analysis differs from the account of Hebrew argued for by Landau only in that it is the morphology rather than the syntax that provides multiple instantiation of identical features.

(10) Morphological reduplication by MS feature duplication:



While the analysis in (10) is logically possible, the prevailing intuition that word reduplication should be treated as phonological copying (as in (7)) has precluded the development of a detailed theory of word reduplication based on MS feature duplication.

This book addresses this asymmetry in previous approaches to morphological reduplication, surveying a wide range of duplication effects and developing numerous arguments to support the use of MS feature duplication, formalized as Morphological Doubling Theory, for morphological reduplication, while reserving phonological copying as the correct analysis of purely phonologically driven duplication.

1.2 Morphological Doubling Theory

The essential claim of Morphological Doubling Theory (MDT) is that reduplication results when the morphology calls twice for a constituent of a given semantic description, with possible phonological modification of either or both constituents. MDT has roots in proposals by Hyman, Inkelas, and Sibanda (to appear) and also resonates in important respects with Yip's (1997; 1998) REPEAT(Stem) constraint, with the large body of work on Bantu reduplication by Downing (1997; 1998a; 1998b; 1998c; 1998d; 1998e; 1999a; 1999b; 1999c; 2000a; 2000b), with the Reduplicative Blending Theory of Sherrard (2001) and with the word-and-paradigm approach of Saperstein (1997), who also argues for a type of double stem selection and eschews the use of a morpheme "RED" which phonologically copies a base. MDT also has points of contact with Steriade's Lexical Conservatism approach to allomorphy; see, for example, Steriade 1997; 1999. Arguments supporting elements of the MDT approach to reduplication can be found in Pulleyblank (to appear).

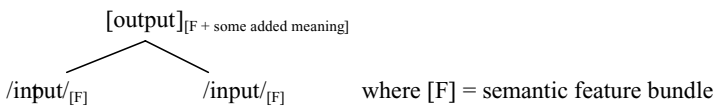
Any morphological analysis requires an explicit morphological framework. In this book, MDT is couched within Sign-Based Morphology (SBM; Orgun 1996; 1997; 1999; Orgun & Inkelas 2002), a flexible morphological framework which can incorporate many different approaches to morphology. SBM, discussed more fully in §1.2.2, is compatible both with item-based and with realizational morphology; it is compatible with Optimality Theory and with

rule-based theories of phonology. The SBM framework makes it easy to discuss and depict morphological constructions, a centerpiece of the approach to reduplication developed here.

1.2.1 The morphology of reduplication

MDT assumes the basic structure in (11) for morphological reduplication. A reduplicated stem (or "reduplication construction," to use a theory-neutral descriptive term) has two daughters that are featurally identical, i.e., mean the same thing:

(11)



By requiring the two sisters to be identical only semantically, MDT makes a prediction which sets it apart from all phonological copying theories: other kinds of deviation, whether morphotactic or phonological, between the two copies are expected to be possible.

A theory much like MDT is anticipated by Moravcsik (1978), who writes:

> Constituents to be reduplicated may in principle be definable . . . either by their meaning properties only, or by their sound properties only, or in reference to both. They may, in other words, be either semantic-syntactic constituents, such as one or more semantic-syntactic features, or morphemes, or words, or phrases, or sentences, or discourses; or they may be phonetic-phonological terms, such as one or more phonetic-phonological features, or segments, or syllables; or they may be morphemes of a particular phonetic shape, or sentences of a particular number of phonetic segments; etc. (pp. 303–304)

Moravcsik wrote this passage at a time when it was thought that the first type of reduplication did not exist; she states (p. 305) that no language possesses a reduplicative construction "which involves the reduplication of a syntactic constituent regardless of its form . . . in reduplication reference is always made both to the meaning and to the sound form of the constituent to be reduplicated." Similar statements are made on p. 315, fn. 8.

Our subsequent research has revealed some of the missing data that supports Moravcsik's original hypothesis that reduplication does not necessarily involve phonological identity. A number of morphological constructions require semantic identity, semantic similarity or (in some cases) semantic dissimilarity between their daughters. Among the cases of this sort, discussed in Chapter 2, are languages exhibiting "synonym compounding," in which the two members of the compound are phonologically distinct, perhaps etymologically distinct

synonyms (e.g. Khmer *peel-weeliə* 'time,' from Sanskrit *peel* 'time' + Pali *weeliə* 'time'; Ourn & Haiman 2000:485). In the Khmer and Vietnamese examples below, the meanings of these constructions can be lexicalized but frequently are the same as the meaning of the individual parts. Page numbers for Khmer and Vietnamese refer to Ourn and Haiman 2000 and Nguyen 1997, respectively:

(12)

a. Khmer synonym compounds			
cah-tum	'old + mature'	'village elder'	485
kee-mərdɔk	'heritage + heritage'	'legacy'	501
cɑmnəj-ʔahaa(r)	'food + food'	'food'	485
ʔaar-kɑmbaŋ	'secret + secret'	'secret'	500
cbah-prakɑt	'exact + exact'	'exact'	500
b. Vietnamese synonym compounds			
mạnh-khoẻ	'strong + strong'	'well in health'	67
dơ bẩn	'dirty + dirty'	'filthy'	67
lười-biếng	'lazy + lazy'	'slothful'	67
tội-lỗi	'offense + fault'	'sin'	70
kêu-gọi	'to call + to call'	'to call upon, appeal'	70

It is argued in Chapter 2 that any theory with the ability to model these constructions already has the ability to model reduplication and does not need recourse to extra mechanisms like a RED morpheme or base-reduplication correspondence. Some related arguments against a morphemic approach to reduplication can be found in Saperstein 1997.

Another type of case discussed in Chapter 2 is divergent allomorphy, in which the two copies – "base" and "reduplicant," to use traditional terminology – differ in their morphological makeup. Divergent allomorphy provides striking evidence for the MS feature duplication approach because it clearly shows that the two copies can have different morphological inputs, as long as they are semantically matched. Recall that in Hebrew VP-fronting, alluded to in (6), the two copies of the verb appear in different forms. Chechen (North Caucasian) likewise illustrates the possibility of divergent allomorphy when a construction calls for only semantic identity between independent copies. Chechen exhibits syntactic reduplication to satisfy the requirements of a second position clitic (Conathan & Good 2000; see also Peterson 2001 on the closely related language Ingush). As shown in (13), from Conathan and Good (2000:50), chained clauses are marked by an enclitic particle *ʔa*, which immediately precedes the inflected, phrase-final, main verb. The enclitic must be preceded by another element in the same clause. Two types of constituent may occur before the verb (and enclitic particle) in the clause: an object (13a), or a deictic proclitic or preverb (13b).

If neither of these elements is present in a chained clause, then the obligatory pre-clitic position is filled by reduplicating the verb (13c):[8]

(13) a. Cickuo, [chʔaara =ʔa gina]$_{VP}$, ʔi buʔu
cat.ERG [fish =& see.PP]$_{VP}$ 3S.ABS B.eat.PRS
'The cat, having seen a fish, eats it.'
b. Aħmada, [kiekhat jaaz =ʔa dina]$_{VP}$, zhejna dueshu
Ahmad.ERG [letter write =& D.do.PP]$_{VP}$ book D.read.PRS
'Ahmad, having written a letter, reads a book.'
c. Aħmad, [ʕa =ʔa **ʕiina**]$_{VP}$, dʕa-vaghara
Ahmad [**stay.INF** =& **stay.PP**]$_{VP}$ DX.V.go.WP
'Ahmad stayed (for a while) and left.'

The Chechen reduplicant occurs in infinitive form, while the main verb is inflected. Inflected verbs require a different form of the verb stem from that used in the infinitive; in some cases the stem allomorphy is clearly suppletive, e.g. *Dala* 'to give' vs. *lwo* 'gives,' or *Dagha* 'to go' vs. *Duedu* 'goes.' As Conathan and Good (2000:54) observe, the result is that Chechen can exhibit suppletive allomorphy differences between base and reduplicant; they cite as one example the reduplicated verb phrase *Dagha 'a Duedu*, based on 'go.'

What is going on in Chechen is the use of two verbs with (almost) the same meaning. MS feature duplication allows for divergent allomorphy of this sort, since there is no requirement that multiple tokens of concurring feature bundles be expressed identically. Divergent allomorphy in reduplication is, however, impossible to generate with phonological copying, since the normal base-to-reduplicant copying process cannot introduce an allomorph into the reduplicant that is not present in the base. Therefore, evidence that morphological reduplication exhibited divergent allomorphy would provide strong support that MS feature duplication, rather than phonological copying, is the driving force in reduplication.

Divergent allomorphy does indeed occur in morphological reduplication. Consider, for example, a fragment of data from Sye (Central-Eastern Oceanic; Crowley 1998; 2002d).[9] Sye presents the type of morphological divergence in which reduplicant and base contain different suppletive allomorphs of the same morpheme. The main points of Sye reduplication are these:

(14) a. Most verb roots in Sye appear in two different shapes: Stem1 and Stem2
b. Each affixation construction selects for one of the two stem shapes
c. Reduplication in morphological contexts calling for Stem1 yields two copies of Stem1
d. Reduplication in contexts that call for Stem2 surfaces as Stem2-Stem1

Examples of some stems showing this allomorphy are shown below:

(15)

Stem1	Stem2	Gloss	
evcah	ampcah	'defecate'	Crowley 2002d:704
ocep	agkep	'fly'	Crowley 1998:84
omol	amol	'fall'	Crowley 1998:79

Reduplication in Sye, which is total and has an intensifying meaning, is illustrated in (16). As seen, the verb 'fall' is reduplicated and combined with the third person future prefix, which conditions the Stem2 form of a verb. The two copies of 'fall' assume different stem shapes: *amol* is Stem2 and *omol* is Stem1:

(16) cw-**amol-omol** '3.FUT-fall$_2$-fall$_1$ = they will fall all over'

Because the phonological relationship between Stem1 and Stem2 is not fully predictable, the "reduplicant" in a Sye reduplicated verb cannot always be described as a phonological copy of the "base," as phonological theories of reduplication would require. Rather, in at least some cases the reduplicant and base consist of different suppletive allomorphs of the same morpheme.

Ndebele (Nguni; Bantu) presents a different kind of divergent allomorphy in reduplication: the reduplicant contains semantically empty morphs not present in the base (Downing 1999a; 2001; Sibanda 2004; Hyman, Inkelas & Sibanda to appear). One such morph is the stem-forming *-a* (see Chapter 2 for a fuller discussion). Reduplication, which targets the verb stem and contributes the meaning that "the action is done for a short while before it stops or is done from time to time, perhaps not very well" (Sibanda 2004:282), truncates the first copy of the verb stem to two syllables. When the root is itself disyllabic or longer, the reduplicant consists of its initial two syllables. The outputs of reduplication here and throughout are shown with the final vowel in place, the standard citation form for verb stems. Data are taken from Hyman, Inkelas, and Sibanda to appear (HIS) and Sibanda 2004 (S):

(17)

nambith-a	nambi+nambith-a	'taste'	HIS
thembuz-a	thembu+thembuz-a	'go from wife to wife'	HIS
hlikihl-a	hliki+hlikihl-a	'wipe'	S:289
dlubulund-a	dlubu+dlubulund-a	'break free of control	S:289
tshombuluk-a	tshombu-tshombuluk-a	'become unrolled'	S:289

There are some conditions, however, under which empty morphs can appear in the reduplicant which are not present, because nothing motivates their presence, in the base. One condition is when the verb root is monosyllabic. As